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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|------------------------|---------------------|------------------|
| 09/881,460 | 06/14/2001 | Douglas W. Couwenhoven | 82887RLO | 7546 |

7590 06/20/2005

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EXAMINER

MENBERU, BENIYAM

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2626

DATE MAILED: 06/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/881,460 | COUWENHOVEN ET AL. | |
| | Examiner | Art Unit | |
| | Beniyam Menberu | 2626 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Arguments

1. Applicant's arguments, see pages 5-6, filed on January 26, 2005, with respect to the rejection(s) of claim(s) 1-10 under U.S. Patent No. 5633662 to Allen et al in view of U.S. Patent No. 6327052 to Falk further in view of U.S. Patent No. 5,857,063 to Poe et al have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of U.S. Patent No. 6690485 to Borrell et al in view of U.S. Patent No. 5633662 to Allen et al further in view of U.S. Patent No. 6042211 to Hudson et al.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim Rejections - 35 USC § 103

3. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6690485 to Borrell et al in view of U.S. Patent No. 5633662 to Allen et al further in view of U.S. Patent No. 6042211 to Hudson et al.

Regarding claim 1, Borrell et al disclose a method for modifying an input digital image having an (x, y) array of pixels, each pixel having an input code value for one or more color channels, wherein said input code value has a nonlinear relationship to

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colorant amount (column 8, lines 43-51; column 10, lines 16-31), to form an output digital image containing output code values for each pixel subject to a total colorant amount limit, comprising the steps of (column 16, lines 45-58):

- a) determining an input colorant amount for each color channel of a pixel in response to the corresponding input code value and a colorant amount function that relates the input code value to the colorant amount for the corresponding color channel (column 11, lines 48-54). However Borrell et al does not disclose
- b) determining a modified colorant amount for each color channel of the image pixel responsive to the input colorant amount for each color channel and a total colorant amount limit;
- c) determining an output code value for each color channel of the pixel responsive to the modified colorant amount and an inverse colorant amount function that relates colorant amount to the output code value for the corresponding color channel, and
- d) repeating steps for each pixel in the input digital image.

Allen et al disclose a method for determining a modified colorant amount for each color channel of the image pixel responsive to the input colorant amount for each color channel and a total colorant amount limit (column 4, lines 64-67; column 5, lines 1-2, lines 15-18, lines 25-32) and d) repeating steps for each pixel in the input digital image (column 5, lines 29-32).

Hudson et al disclose determining an output code value for each color channel of the pixel responsive to the modified colorant amount and an inverse colorant amount

function that relates colorant amount to the output code value for the corresponding color channel (column 6, lines 17-26, lines 57-65).

Borrell et al, Allen et al, and Hudson et al are combinable because they are in the similar problem area of color printing.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the method of colorant modification of Allen et al and the colorant amount transformation of Hudson et al with the system of Borrell et al to implement colorant modification and inverse colorant transformation subject to ink limitation.

The motivation to combine the reference is clear because Allen et al provides for a method to limit ink subject to a ink amount limitation so as to prevent excess ink usage (column 3, lines 26-31) and the method of Hudson et al is useful for printing color images which is independent of variances in ink volume (column 1, lines 59-64).

Regarding claim 2, Borrell et al in view of Allen et al and further in view of Hudson et al teach all the limitations of claim 1. Further Borrell et al disclose that the input colorant amount is substantially linear with colorant volume (column 14, lines 56-62).

Regarding claim 3, Borrell et al in view of Allen et al and further in view of Hudson et al teach all the limitations of claim 1. Further Hudson et al disclose the input colorant amount is a mass of colorant (column 6, lines 17-26; Hudson et al disclose transformation from tone level to ink volume. Volume of ink implies mass.).

Regarding claim 4, Borrell et al in view of Allen et al and further in view of Hudson et al teach all the limitations of claim 1. Further Hudson et al disclose a lookup table for each color channel wherein the colorant amount function is provided by the lookup table (column 6, lines 17-27).

Regarding claim 5, Borrell et al in view of Allen et al and further in view of Hudson et al teach all the limitations of claim 1. Further Hudson et al disclose the colorant amount function and the inverse colorant amount function are substantially mathematically inverse operations from each other (column 6, lines 17-65; Hudson et al uses the same table 24, shown in Figure 2, to calculate volume from tone value and tone value from volume data, thus it can be shown that this table performs inverse operations.).

Regarding claim 6, Borrell et al in view of Allen et al and further in view of Hudson et al teach all the limitations of claim 1. Further Allen et al disclose step b) further includes the steps of:

- i) determining a total colorant amount for each pixel as the sum of the colorant amounts for each of the color channels (column 5, lines 55-58)., and
- ii) determining the modified colorant amount for each color channel of the pixel responsive to the total colorant amount and the total colorant amount limit such that for such pixel the sum of the modified colorant amount for each color channels is less than the total colorant amount limit (column 5, lines 58-61, column 6, lines 4-8).

Regarding claim 7, Borrell et al in view of Allen et al and further in view of Hudson et al teach all the limitations of claim 1. Further Allen disclose that the colorants are inks for use in an inkjet printer (column 4, lines 28-31).

Regarding claim 8, Borrell et al in view of Allen et al further in view of Hudson et al teach all the limitations of claim 7. Further Allen disclose that the colorant amounts correspond to ink volumes (column 5, lines 27-31).

Regarding claim 9, Borrell et al in view of Allen et al and further in view of Hudson et al teach all the limitations of claim 1. Further Allen disclose forming a color image in response to the modified digital image produced by claim 1 (column 5, lines 20-23).

Regarding claim 10, Borrell et al in view of Allen et al and further in view of Hudson et al teach all the limitations of claim 1. Further Allen disclose a computer storage medium having instructions stored therein for causing a computer to perform the method of claim 1 (column 4, lines 3-4).

Other Prior Art Cited

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 6084689 to Mo discloses compensation for ink limit.

U.S. Patent No. 6312101 to Couwenhoven et al discloses digital image printing.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Beniyam Menberu whose telephone number is (571) 272-7465. The examiner can normally be reached on 8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly Williams can be reached on (571) 272-7471. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the customer service office whose telephone number is (571) 272-2600. The group receptionist number for TC 2600 is (571) 272-2600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.


For more information about the PAIR system, see <http://pair-direct.uspto.gov/>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Patent Examiner

Beniyam Menberu

BM

06/09/2005


SCOTT ROGERS
PRIMARY EXAMINER